



Underfloor Heating & Renewables

UltraFlo

Installation Guide

UNDERFLOOR
HEATING

GROUND SOURCE
HEAT PUMPS

AIR SOURCE
HEAT PUMPS

SOLAR
THERMAL PANELS

UltraFlo

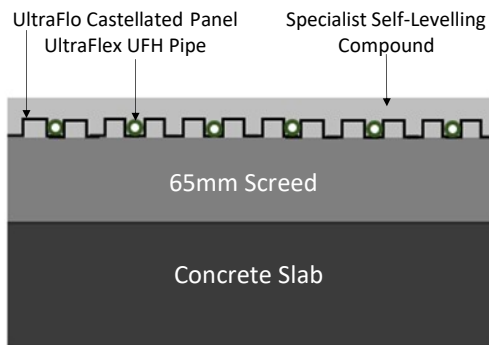
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INSULATION CONSIDERATIONS:

FOR EXISTING SOLID CONCRETE FLOORS

UltraFlo has been specifically designed for existing buildings, renovations, extensions, and conservatories. Because of the UltraFlo floor build up being only 22mm, for existing solid concrete floors, it makes no economic sense to excavate and introduce insulation, as the costs of doing so would be prohibitively expensive. Unless the floor is not structurally sound, then an overlay system with minimum height build up is a sound and reasonable solution to excavation and relaying of an existing concrete floor.

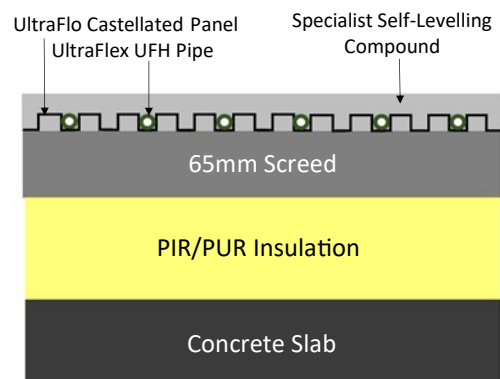


Because of this there is no requirement for insulation to be added to an existing solid floor over solid ground. As the average soil temperature beneath a building is usually constant at 10°C, the downward losses are limited to 6-10% of the total heat output, which represents a small percentage of the total annual heating costs. As the efficiency of UFH is 25% greater than radiators, it is still more cost effective than traditional heating.

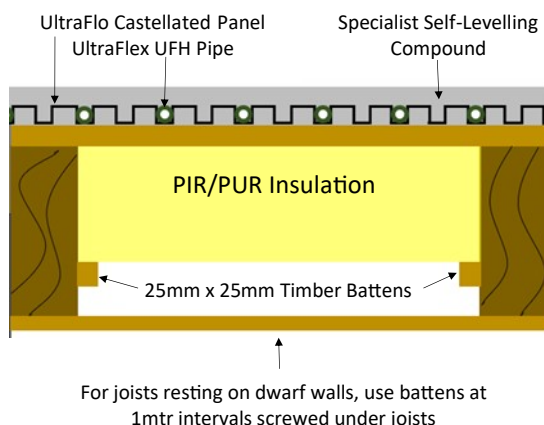
In addition, as the 22mm UltraFlo is relatively thin there is not the mass associated with normal screeded systems of 65mm or greater, therefore the UltraFlo heats up extremely fast, usually within 15-20 minutes, unlike a traditional screeded system which can take many hours from cold. The UltraFlo system, once it reaches temperature and has heated the room, will turn off, therefore further limiting the downward losses.

NEW SOLID CONCRETE FLOORS:

Where a new extension is being added onto an existing older building, insulation is added as part of the building regulations, and UltraFlo can be laid directly over the top of the screed, therefore the downward losses would be greatly reduced.



TIMBER SUSPENDED FLOORS:



If there is a ventilated void beneath the ground floor, such as timber suspended or a block and beam construction, then insulation would be required as the temperature within the void would be the same as the external temperature. With this low ambient temperature within the void plus the air movements inherent with this type of floor structure, there is little resistance to downward heat transfer and so must be insulated to prevent excessive heat losses. 100mm of PIR/PUR or mineral wool equivalent would be sufficient. No insulation is required on first or second floor applications, except what is required by the building regulations for sound transmission.

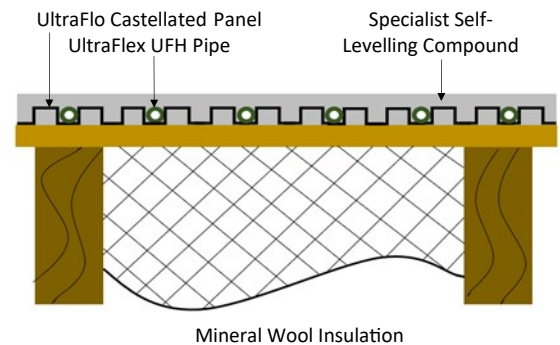
For rigid insulation, 25mm x 25mm battens either side of the joists is sufficient to hold the insulation in place. It is important that no air gaps are present between the underside of the chipboard floor boards and the PIR/PUR insulation boards. If the joists are only 100mm deep resting on dwarf walls, then battens screwed to the underside of the joists spaced at 1mtr intervals would be acceptable.

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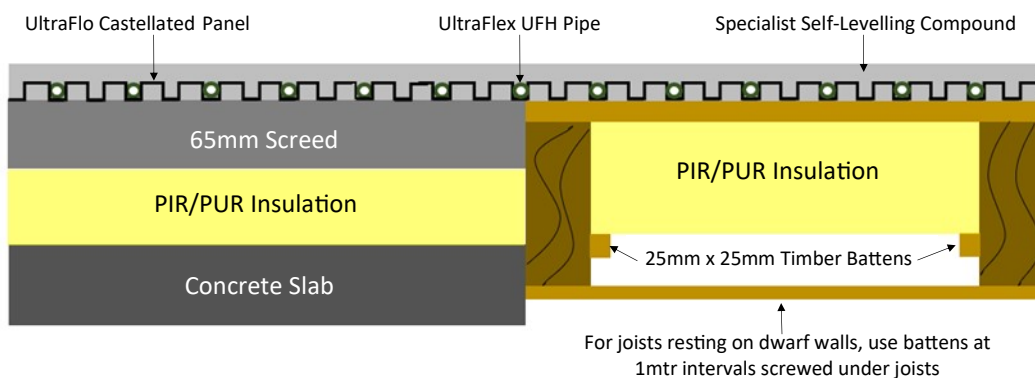


If using mineral wool insulation, consider using a plastic netting, which can be used to hold the insulation in place. Simply place over the existing joists, pulled tight, and staple to the sides, making sure there is enough space for at least 150-200mm of mineral wool to be placed in the space between.



Timber Suspended and New Extensions

Where a new extension is being added to an existing timber suspended floor, the UltraFlo can be used to span both sections. An expansion joint between the two sections may be advisable due to settlement, which could crack tiles if these were used on the final floor finish.



FLOATING FLOORS:

Existing floating floors usually consists of an 18mm or 22mm T&G chipboard with an insulation layer of PIR/PUR underneath on a rigid concrete base. As long as the floor is in good repair and condition, UltraFlo may be installed over the top of the chipboard deck, however depending on the condition of the floor, it maybe be necessary to strengthen between the doorways, especially if there is any deflection detected.

OTHER CONSIDERATIONS:

Although the height build-up of UltraFlo is limited to only 22mm (aprox ¾") it's impact should be considered:

- **Skirting** – It is best to remove existing skirting before laying the UltraFlo. A 10mm gap is needed, which is taken up with the perimeter insulation strip. A new skirting would hide this expansion gap.
- **Doors** – At door thresholds, the extra 22mm height will likely impact on door clearances, so these will need to be trimmed, plus the height of any floor finish.
- **Stairs** – For UltraFlo installed on a ground floor, some build up is unavoidable and the bottom step will be shallower, however in a renovation, this is not normally a problem. However, with first and second floor applications the treads may need to be adjusted to reflect the change in levels at the top step.
- **Kitchen units** – Where a new kitchen is being installed, it is best to have the UltraFlo laid underneath (without the heating tube) to keep the same level throughout. If the kitchen is not being removed, then the UltraFlo can be laid up to the kick boards.
- **Other rooms**—The impact of other adjoining rooms not having UFH needs to be considered. Using UltraFlo will increase the floor height by 22mm plus any floor finish, so at a threshold of another room a small step will be created. This can be mitigated by overlaying adjoining rooms with a 22mm chipboard flooring, or by using a self-levelling compound, to increase the depth of the floor to match the UltraFlo UFH. Alternatively, a chamfered threshold can be used in doorways to offset these small changes.

FLOOR PREPERATION

It is extremely important that proper consideration be given to the sub-floor preparation, as this is the key to a successful installation of the whole UltraFlo system. Ignoring these recommendations could lead to much greater time taken in remedial works and costly mistakes being made.

SOLID CONCRETE OR SCREED SUB-FLOORS:

Before installation of the UltraFlo castellated panels the condition of the sub-floor needs to be considered. All defects, such as loose or friable material needs to be removed and any repairs needs to be undertaken. If the floor is uneven or not level, this is the time to get this corrected using a self-levelling compound, which can be purchased via most builder's merchants.

Once the floor has been repaired or levelled or both, and is swept clean of dust, the sub-floor must be primed using the Mapei Eco Prim T sealant. This ensures that the sticky backed castellated panels can adhere properly to the sub-floor. Any gaps and the risk of the specialist self-levelling compound to lift the panels when pouring could occur.

Mi-Heat supply enough self-levelling compound to an SR2 standard, which is maximum deviation of 5mm over the floor area. Anything outside this will need correcting beforehand with a cheaper self-levelling compound, or alternatively more of the specialist self-levelling compound that Mi-Heat supply for the UFH.

TIMBER SUSPENDED & FLOATING SUB-FLOORS:

Before installation of the castellated panels, it is imperative that the condition of the sub-floor be considered. Any loose floor-boards need to be fixed down or replaced so that there is no movement. Any large gaps in the floor or in the perimeter walls needs to be filled and sealed to avoid any seepage of self-levelling compound, before the castellated panels are laid.

The sub-floor must be free of dust, loose or friable material and suitably flat and level before laying the castellated panels. The sub-floor must be sealed using the Mapei EcoPrim T supplied to provide a good bond between the sub-floor and the castellated panel.

Mi-Heat supply enough self-levelling compound to an SR2 standard, which is maximum deviation of 5mm over the floor area. Anything outside this will need correcting beforehand with a cheaper self-levelling compound, or alternatively more of the specialist self-levelling compound that Mi-Heat supply for the UFH.

Extremely important questions you need to consider before laying the castellated panels:

Is the existing floor to SR2 level?

For timber suspended floors, have all loose boards been properly secured?

Have any large gaps or holes where the self-levelling compound could escape been sealed?

For existing solid floors, has all loose material and dusty or friable material been removed?

Has the timber or concrete floor been properly sealed with the Mapei Eco-Prim T primer?

Has the floor probe channel in the wall from the neoStat to the floor completed?

Has the site been cleared of other trades so that no one is walking over your work?

Is the existing floor to SR2 level?

It is quite common to have a floor that is sloping from a high point in the room to the other side, and although it looks flat, can still be 10-30mm difference in height. Mi-Heat supply enough self-levelling compound to SR2 standard so if the floor deviates from this then you will need more compound. **It is significantly more cost effective to level the floor before installing the UltraFlo using an anhydrate self-levelling compound.** This is because Mi-Heat supply a premium quality self-levelling compound that can withstand the constant heating and cooling without significant cracking to its surface area, which is extremely important for the final floor finish. SR2 standard is a maximum deviation of 5mm over 3 meters.

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ADDITIONAL SELF-LEVELLING COMPOUND

Area	5m ²	10m ²	15m ²	20m ²	25m ²	30m ²	35m ²	40m ²
Variation	Out of level by more than +/-2.5mm over floor area Number of extra bags of self-levelling compound required							
+/-2.5mm	0	0	0	0	0	0	0	0
+/-5mm	1	2	2	4	4	6	6	7
+/-7.5mm	2	3	5	7	9	11	12	14
+/-10mm	3	5	6	11	13	16	18	21
+/-12.5mm	4	7	10	14	17	21	23	28
+/-15mm	4	8	12	17	21	26	29	36
+/-17.5mm	5	10	15	21	26	32	35	41
+/-20mm	6	12	18	24	30	37	41	48

The UltraFlo UFH system has been designed with sufficient specialist self-levelling compound to cover the area, with a tolerance to SR2 standard, which is no more than +/-2.5mm over the floor area. If the floor is uneven, or slopes beyond this tolerance, extra self-levelling compound will be required. Use the table to calculate the number of extra bags required.

Installation of the UltraFlo

- Before fixing the castellated panels, all thermostat wiring, and sensor cables should have been fitted (sensors supplied). (Please see page 7 for further information on floor sensors).
- General building work and plastering should be completed.
- Thoroughly clean the floor of debris, ideal would be an industrial or heavy-duty vacuum cleaner.
- Fix any loose floorboards and fill any gaps, which includes gaps between walls and floor.
- The floor must be sound, cleaned and primed with the Mapei EcoPrim T sealant (supplied).
- Fix the perimeter expansion strip around perimeter of wall.
- The perimeter strip can be used to seal a room across the doorway and as an expansion break.
- Fix the manifold and primary pipework (optional)
- You are now ready to fix the UltraFlo castellated panels.

FITTING THE CASTELLATED PANELS:

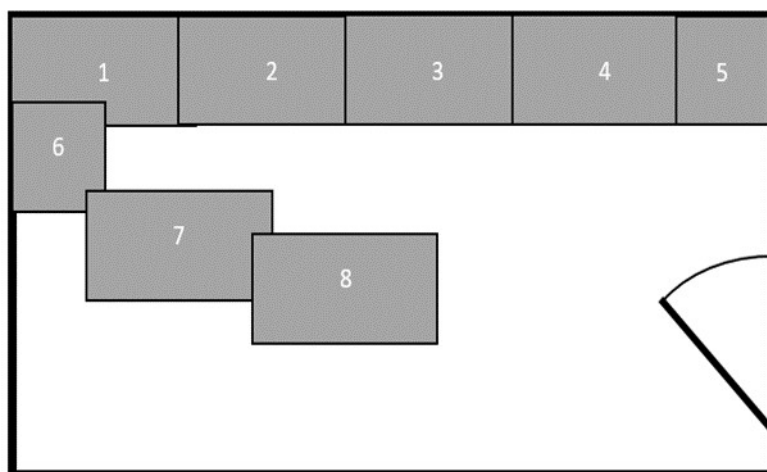
The MI-Heat UltraFlo castellated panel is very robust, unlike similar panels by other manufacturers, however care should still be taken installing to avoid damage to the castellations. Using kneeling and walking boards over the panels is strongly advised. Keep other trades away from the installation during laying of the panels, installing the pipework and until after the self-levelling compound has been poured and dried would be highly advisable.

The laying of the panels should be in a brick-bond fashion and start with the farthest corner of the room. Lay the first panel by removing the backing strip and pressing very firmly into place by hand. Continue along the wall and overlap each of the panels by one castellation and they will bond together and seal.

Cut around obstacles or protrusions using a knife.

Once reaching the end of the first row, any offcuts can be use on the 2nd row. Remember to overlap onto the 1st row with the castellations.

Continue each row until the whole room is completed.



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- Seal the floor with the Mapei EcoPrim T sealant. (Follow instructions on bottle)
- Fix perimeter strip around all walls.
- Fit the first panel in the furthest corner of the room. Peel the backing and press down firmly onto sub-floor.
- For the second and subsequent panels, overlap by one castellation. Press down firmly to make a watertight seal, which is necessary to avoid the self-levelling compound leaking through and lifting the panel.
- For any obstructions and at end of the run, use a sharp knife and straight edge to cut the panels.
- Use the last panel cut off to start the next row and continue with the next and subsequent rows. Remember to overlap the previous row by one castellation.
- Fit the castellated panel to the entire room, until the whole room is finished. Any loose panels should be securely anchored down, and if not, will need to be stapled or nailed. Pay close attention to the perimeter.
- At the doorway and threshold, use the expansion strip to seal off the room, which can be doubled up for greater strength. Attach to the castellated panel, using extra tape if required. Cut out or slit for any pipes that pass through and seal with tape or foam sealant.

EXPANSION BREAKS:

Expansion breaks should be installed at the threshold of every room, where the UFH pipe passes through. The expansion strip used to line the walls can be used for this purpose, which can be doubled up for extra strength. Seal the expansion strip with tape so that no self-levelling compound can escape into another room. Cut out or slit for pipes that pass through and seal with tape or foam sealant. Any areas which are over 40m², where the length exceeds 8mtrs or where there is a change of direction, such as in an L shaped room, an expansion joint must be used (not supplied). This must be stuck down and notched for the UFH pipe to pass through, and then sealed, using tape or sealant.

LAYING OF THE UFH PIPE:

Please refer to the pipe layout drawing which came with your design. The spacings between the pipe for each room is critical to ensure the right heat output and should be constant across the whole of the room.

Start laying pipe from the manifold.

Unroll the pipe hand over hand and push into castellated panels.

Be careful not to kink the pipe when turning at the end of straight runs.

Loose pipes can be secured with nail clips (supplied).

The manifold should be secured to the wall high enough to accommodate the pipe and the guided bends.

Connect flow and return pipes and use a marker pen to label each flow and return with room each are serving.

- The manifold should be positioned high enough on the wall to accommodate the 12mm pipe and guide. Start pipe laying from the manifold and return to corresponding port. Mark the pipes with a marker pen with which loop and room being served.
- When laying the pipe, follow the A3 Tube Layout Drawing that came with the design. Roll out the pipe, being careful not to kink the pipe. Use a hand over hand method or use a pipe de-coiler. Push firmly into the castellated panel. Secure any loose pipes with nail clips if necessary.
- Seal any pipes with tape or foam sealant where they pass through the expansion strip in the doorway. This is to ensure that any self-levelling compound does not run into another room.

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FITTING FLOOR SENSORS:

Because of the low height build up and the characteristics of the self-levelling compound, the UltraFlo has the largest output of any in our range, which can significantly exceed the permitted temperature of a maximum of 120w/m², therefore temperature sensor probes are required to keep the floor temperature from exceeding this. If using engineered wood or vinyl flooring, then the surface temperature should not exceed 27C, as this could damage them, which is a further reason for fitting these sensors.



The sensor is fitted to the NeoStat and should be channelled into the wall within a conduit. The probe must extend into the floor by at least 300mm, but the sensor should be as far away from the UFH pipe as possible, usually between the runs. Use off cuts of pipe as a conduit in the floor. The sensor end should be as near to the surface as possible. The cable can usually be installed under any pipework it needs to cross, or if it goes over the pipe, make sure ties hold it down as it could risk floating with the pouring of the self-levelling compound. Seal the ends of the conduits with mastic so that the conduit does not fill up with the self-levelling compound.

Note: In wet areas, such as bathrooms and en-suites, for electrical safety, there will be only a remote air sensor instead of a floor sensor. This is fitted in a wet area at light switch height, and the air sensor is contained within a white protective cover.

PRESSURE TESTING OF MANIFOLD & UFH PIPE

Once the UFH pipework and the floor sensors have been fitted, the whole system should be filled with water and pressure tested. Any leaks should be rectified, and the pressure test can be left overnight before the self-levelling compound is poured.

SELF-LEVELLING COMPOUND

Once the castellated panels, the floor sensors and the UFH pipe have been fitted, filled, and pressure tested, the self-levelling compound should be poured over the top as soon as possible.

Starting at the furthest corner of the room, the self-levelling compound should be poured as one single coat to a depth of 22mm. Some hand trowelling may be required to move the compound to a level and even surface.

The maximum depth in a single pour is 30mm. If a second layer is required, apply after the first layer can be walked on, which is usually around 3-4 hours later. If the first layer is completely dried out, the first layer must be primed with the Mapei EcoPrim T.

- **Starting in the furthest corner of the room, pour the self-levelling compound over the floor to a depth of 22mm. Continue mixing and pouring until the whole room has been covered.**
- **The self-levelling compound should be poured in a single coat to achieve a smooth level surface.**
- **Some hand trowelling is required to achieve a level and even surface.**
- **If there is not enough self-levelling compound to finish the project it is likely that the floor was not to SR2 standard. In this case, if the self-levelling compound just laid is still not set and is within 12 hours of laying, another layer of compound can be poured over low areas.**
- **If the compound has cured, or 48 hours has passed since laying, the floor must be primed with one coat of undiluted Eco-Prim T primer (or similar).**

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FLOOR COVERINGS

Once the self levelling compound has fully cured (usually around 72 hours) the final floor finish can be laid. This can be tested by fastening a 2mtr sheet of clear polythene and leaving overnight. If there is moisture on the inside, then leave to cure another 24 hours. Repeat the process until the polythene sheet is clear, and if so then the floor can safely be covered.

Ceramic Tiles: Virtually any floor covering can be used, however the best is those that have little resistance to heat transference, such as stone, ceramic tiles and laminate flooring solutions. If using tiles, a de-coupling layer should be laid before tiling so as to avoid tiles cracking.

Engineered Wood: Engineered wood flooring is also an excellent choice, and because of its laminate construction, it is very stable. A floor sensor should be installed to protect the floor from overheating and keeping the surface temperature to a maximum of 27°C. The floor sensor is supplied by Mi-Heat once the floor coverings are known.

Solid Wood: Greater care should be taken when using solid wood flooring, which should have a low moisture content. Before installation, natural wood needs to be acclimatised to the climactic conditions in the property. For any wood flooring, a floor sensor should be installed, to protect the floor from overheating and keeping the surface temperature to a maximum of 27°C. The floor sensor is supplied by Mi-Heat once the floor coverings are known.

Vinyl & Linoleum: Vinyl and Lino flooring, such as Amtico and Karndean, is also another popular choice, and again a floor sensor will be required to keep the floor temperature to a maximum of 27°C. The floor sensor is supplied by Mi-Heat once the floor coverings are known.

Carpets: Carpets can be used but the Tog value, when combined with an underlay should be no greater than 2.5 togs.

Note: If the system is powered by a heat pump rather than a traditional gas or oil-fired boiler, greater restrictions apply as the flow temperature is much lower, usually 45°C rather than 55°C.

SELF-LEVELLING MIXERS:

Drill Mixer



Recommended for areas up to 60m².

The self-levelling compound can be mixed by hand and a whole house can be done using this method, simply by dividing into rooms and areas.

Mix the contents of the self-levelling compound with water at the ratio stated on the bag. Adding more water than is recommended will alter the consistency of the mix, and will weaken the strength, consistency and setting time of the self-levelling compound. The self-levelling compound starts to set after about 30 minutes, so do not mix a greater quantity that can safely be used in that time period. Do not re-wet or add more water once the mix starts to set.

Forced Action Mixer

Recommended for areas up to 100m².

There are many different manufacturers of these types of machines, so always read the instructions for use before starting to mix.

Mix the contents of the self-levelling compound with water at the ratio stated on the bag. Adding more water than is recommended will alter the consistency of the mix, and will weaken the strength, consistency and setting time of the self-levelling compound. The self-levelling compound starts to set after about 30 minutes, so do not mix a greater quantity that can safely be used in that time period. Do not re-wet or add more water once the mix starts to set.



Pump Mixer

Recommended for areas above 100m². This should only be operated by professional contractors.

Mi-Heat have contractors that work in your area and they will be able to offer a price per m² for laying the self-levelling compound.

